

RAJKIYA SNATKOTTAR MAHAVIDHYALAYA JOSHIMATH, CHAMOLI

DEPARTMENT OF BOTANY

COURSE INTRODUCTION

The new curriculum of B.Sc. in Science (Botany) offers essential knowledge and technical skills to study plants in a holistic manner. Students would be trained in all areas of plant biology using a unique combination of core, elective and vocational papers with significant inter-disciplinary components. Students would be exposed to cutting-edge technologies that are currently being used in the study of plant life forms, their evolution and interactions with other organisms within the ecosystem. Students would also become aware of the social and environmental significance of plants and their relevance to the national economy. B.Sc. Botany program covers academic activities within the classroom sessions along with practical concepts at laboratory sessions. Infield, outstation activities and projects would also be organized for real-life experience and learning. Candidates who have curiosity in plants kingdom, ecosystem, love exploring exotic places and wish to work as researchers or professions like Botanist, Conservationist, Ecologist, etc. can choose B.Sc. Botany course.

Programme outcomes (POs)

Transformed curriculum shall develop educated outcome-oriented candidature, fostered with discovery- learning, equipped with practice & skills to deal practical problems and versed with recent pedagogical trends in education including e-learning, flipped class and hybrid learning to develop into responsible citizen for nation-building and transforming the country towards the future with their knowledge gained in the field of plant science.

PO1: CBCS syllabus with a combination of general and specialized education shall introduce the concepts of breadth and depth in learning.

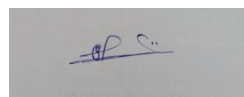
PO2: Shall produce competent plant biologists who can employ and implement their gained knowledge in basic and applied aspects that will profoundly influence the prevailing paradigm of agriculture, industry, healthcare and environment to provide sustainable development.

PO3: Will increase the ability of critical thinking, development of scientific attitude, handling of problems and generating solutions, improve practical skills, enhance

communication skill, social interaction, and increase awareness in judicious use of plant resources by recognizing the ethical value system.

PO4: The training provided to the students will make them competent enough for doing jobs in Govt. and private sectors of academia, research and industry along with graduate preparation for national as well as international competitive examinations, especially UGC-CSIR NET, UPSC Civil Services Examination, IFS, NSC, FCI, BSI, FRI etc.

PO5: Certificate and diploma courses are framed to generate self- entrepreneurship and self- employability, if multi exit option is opted. PO6 Lifelong learning is achieved by drawing attention to the vast world of knowledge of plants and their domestication.



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Programme specific objectives (PSOs)

B.Sc. I Year (Certificate Course in Basic Botany)

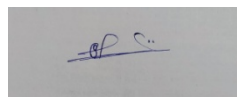
This certificate course will provide knowledge on various fields of basic Botany. The syllabus is prepared to enable students for competitive exams in frontier areas of plant sciences. Students will be able to know about habit, habitat, morphology, anatomy and reproduction of various plant groups.

B.Sc. II Year (Diploma Course in Developmental Botany)

This programme will provide knowledge on plant morphogenesis, anatomy embryology and plant genetics. Laboratory sessions following theory will provide easy understanding of internal structure of various plant parts, structural organization, reproductive biology and genetics. This course will help students to become a plant morphologist.

B.Sc. III Year (Bachelor of Science)

The three year learning outcome of graduation will provide understanding of plant systematic, economic botany, developmental biology, ecology, statistics, physiology, biochemistry. It will provide expertise in conservation biology and reproduction biology. After completing this course successfully students will be able to contribute in the field of plant sciences. The research project will help to develop research aptitude for higher education and scientific research.



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COURSC OUTCOMES

B.Sc. I YEAR FOR CERTIFICATE COURSE IN BASIC BOTANY

Paper 1: Microbes, Algae, Fungi and Bryophytes (Course code: BOT101T)

Course Outcome After the completion of the course the students will be able to:

1. Develop understanding about the classification and diversity of different microbes including viruses, bacteria, Algae, Fungi & Lichens & their economic importance.
2. Develop conceptual skill about identifying microbes, pathogens, biofertilizers & lichens.
3. Gain knowledge about developing commercial enterprise of microbial products.
4. Learn host –pathogen relationship and disease management.
5. Gain Knowledge about uses of microbes in various fields.
6. Understand the structure and reproduction of certain selected bacteria algae, fungi and lichens
7. Develop critical understanding on morphology, anatomy and reproduction of Bryophytes.

Paper 2: Practical/ Lab course (Course code: BOT102P)

Course Outcome After the completion of the course the students will be able to:

1. Understand the instruments, techniques, lab etiquettes and practices for working in a microbiology laboratory.
2. Develop skills for identifying microbes and using them for Industrial, Agriculture and Environment purposes.
3. Practical skills in the field and laboratory experiments in Microbiology and Pathology.
4. Learn to identify algae, lichens and plant pathogens along with their symbiotic and parasitic associations.
5. Students would learn to create their small digital reports where they can capture the zoomed in and zoomed out pictures as well as videos in case they are able to find some rare structure or phenomenon related to Bryophytes.
6. Understand morphology, anatomy, reproduction and developmental changes therein through typological study and create a knowledge base in understanding diversity, economic values & taxonomy of bryophytes.

Paper 1: Pteridophytes, Gymnosperms and Angiosperms (BOT201T)

After the completion of the course the students will be able to:

1. Develop critical understanding on morphology, anatomy and reproduction of Pteridophytes, Gymnosperms and Angiosperms.
2. Understanding of plant evolution and their transition to land habitat.
3. To learn the major patterns of diversity among plants, and the characters and types of data used to classify plants.
4. To compare the different approaches to classification with regard to the analysis of data.
5. To become familiar with major taxa and their identifying characteristics, and to develop in depth knowledge of the current taxonomy of a major plant family.
6. To discover and use diverse taxonomic resources, reference materials, herbarium collections, publications.

Paper 2: Practical/Lab course (BOT202P)

1. The students will be made aware of the group of plants that have given rise to land habit and the flowering plants. Through field study they will be able to see these plants growing in nature and become familiar with the biodiversity.
2. Develop an understanding by observation and table study of representative members of phylogenetically important groups to learn the process of evolution in a broad sense.
3. Understand morphology, reproduction and developmental changes therein through typological study and create a knowledge base in understanding the basis of plant diversity, economic values and taxonomy of plants.

B.Sc. II YEAR FOR CERTIFICATE COURSE IN BASIC BOTANY

Paper 1: Morphology, Anatomy and Embryology (Course code: BOT301T)

1. Understand morphology, anatomy and Embryology.
2. Understand role of tissues in plant functions.
3. Understand the composition, modifications, internal structure & architecture of plants.
4. Understand reproduction and developmental changes in plants.

Paper 2: Practical/Lab Course (Course code: BOT302P)

1. Understand cell structure in monocot and dicot plants.

2. Understand cell structure, secondary growth and adaptive anatomy in plants.
3. Understand the pollination and seed dispersal mechanism.
4. Study the structure of ovules and female gametophytes.

Paper 1: Cytogenetics and Plant Breeding (course code: BOT401 T)

1. Understand the structure and chemical composition of chromatin and concept of cell division.
2. Interpret the Mendel's principles; acquire knowledge on cytoplasmic inheritance and sex-linked inheritance.
3. Understand the plant breeding systems and heterosis and mutation in plant breeding.

Paper 2: Practical/Lab Course (Course code: BOT402 P)

1. Interpret the Mendel's principles; and understand the monohybrid and dihybrid crosses and their ratio and chromosomal changes.
2. Learn the basic structure and function of cells and instruments used in molecular biology

B.Sc. III YEAR FOR CERTIFICATE COURSE IN BASIC BOTANY

Paper 1: Cell and Molecular Biology, and Biotechnology (Course code: BOT501T)

1. Understand cell structure, nucleic acids, organization of DNA in prokaryotes and Eukaryotes, DNA replication mechanism, genetic code and transcription process.
2. Know about processing and modification of RNA and translation process, function and regulation of expression.
3. Understand the basic tools and techniques used in Plant tissue culture.

Paper 2: Economic Botany (Course code: BOT502T)

1. Know about the importance of medicinal plants and its useful parts, economically important plants in our daily life and also about the traditional medicines and herbs, and its relevance in modern times.

Paper 3: Lab Course (Course code: BOT503P)

1. Know about the commercial products produced from plants.
2. Understand about the ethno-botanical details of plants.
3. Learn about the chemistry of plants and herbal preparations

Paper 1: Plant Physiology and Biochemistry (BOT601T)

1. Understand the role of physiological and metabolic processes for plant growth and development.
2. Learn the symptoms of mineral deficiency in crops and their management.
3. Assimilate knowledge about Biochemical constitution of plant diversity.
4. Know the role of plants in development of natural products, nutraceuticals, dietary supplements, antioxidants.

Paper 2: Ecology and Biostatistics (Course code: BOT602T)

1. Acquaint the students with complex interrelationship between organisms and environment;
2. Make them understand methods for studying vegetation, community patterns and processes, ecosystem functions, and principles of phytogeography.
3. Understanding the strategies for sustainable natural resource management and biodiversity conservation.
4. Practical knowledge of the different statistics tools and techniques.

Paper 3: Practical/lab Course (Course code: BOT603P)

1. Understand the role of different physiological and metabolic processes of plants.
2. Gaining practical knowledge implemented in the biodiversity assessment and conservation.
3. Practical knowledge of the different statistics tools and techniques.

Minor Elective Courses in Botany

Paper 1: Plant Science 1 (Course code: PSME01T)

After the completion of the course the students will be able to:

1. Develop understanding about the classification and diversity of different microbes including viruses, Algae, Fungi & Lichens & their economic importance.
2. Gain knowledge about uses of microbes in various fields.
3. Understand the structure and reproduction of certain selected bacteria algae, fungi and lichens

4. Develop critical understanding on morphology, anatomy and reproduction of Bryophytes, Pteridophytes and Gymnosperms.

5. Understand the basic concepts of plant taxonomy 6. Understand morphology, anatomy and embryology

Paper 2: Plant Science II (Course code: PSME02T)

After the completion of the course the students will be able to

1. Understand the basic biochemical and physiological process in plants.
2. Understand the basic of plant tissue culture techniques used in molecular biology.
3. Understand the concept of biodiversity and its conservation and global warming.
4. Learn the concepts of mendelian genetics, plant breeding methods, crop evolution and uses of plants.

Vocational/Skill Enhancement Courses in Botany

i) Bio-fertilizers

1. Develop conceptual skill about identifying microbes, and bio-fertilizers.
2. Gain knowledge about developing commercial enterprise of bio-fertilizers

ii) Herbal Technology

1. Develop conceptual skill about traditional Indian medicinal system, herbal medicines, their processing, storage and marketing.
2. Gain knowledge about developing commercial enterprise of herbal medicines.
3. Learn the basic tools and techniques for phytochemical analysis and propagation of the medicinal plants.

iii) Nursery and Gardening

1. Develop conceptual of nursery and gardening.
2. Gain knowledge about developing commercial enterprise of nursery.

v) Floriculture

1. Develop conceptual skill about floriculture.

2. Gain knowledge about developing commercial enterprise of commercial floriculture.

v) Medicinal Botany

1. Understand the traditional Indian medicinal systems and their importance.

2. To learn the strategies for the conservation of medicinal plants.

3. Gain knowledge about developing commercial enterprise of herbal medicines.

vi) Conservation and Management of biodiversity (Conservation and Natural Resource Management)

1. Understand the importance, benefits and services of biodiversity.

2. To learn the strategies for the conservation of biodiversity

vii) Ethno-botany

1. To learn the proper documentation and presentation of traditional knowledge about plants.

2. To use important plants by the tribal communities for various purposes.

3. To learn the conservation of wild growing plants and their socioeconomic impacts.

viii) Mushroom Cultivation

1. Understand the economic importance of mushroom cultivation.

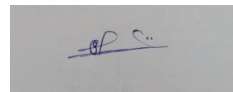
2. To learn the basic tools and techniques used in mushroom cultivation.

3. To learn the skills for developing commercial enterprise of mushroom cultivation.

ix) Intellectual Property Rights

1. Understand the basic concepts of intellectual property rights.

2. To learn the procedure for obtaining the intellectual property rights.



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